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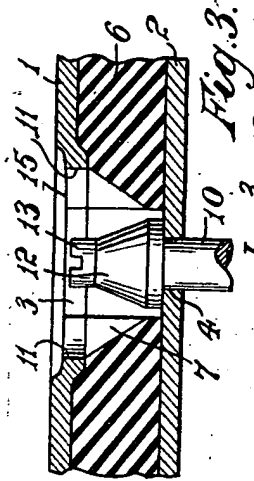


Fig. 3.

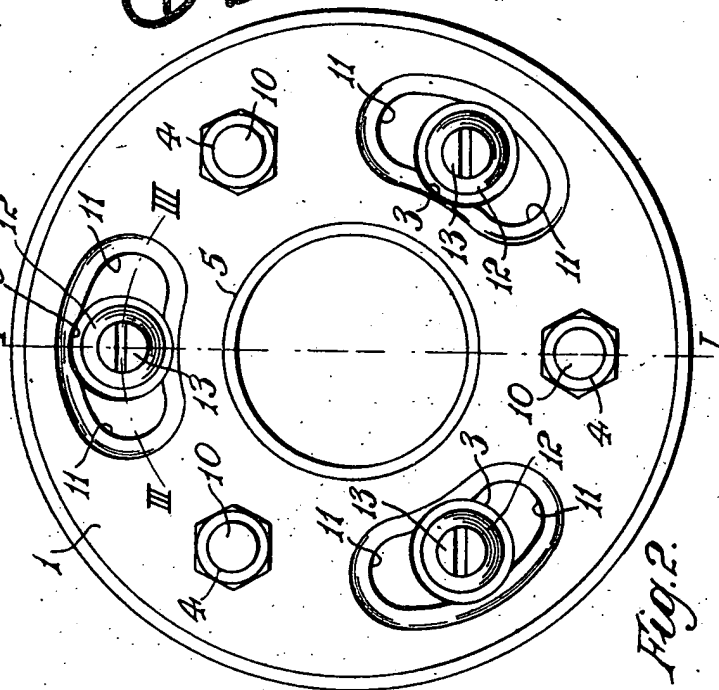


Fig. 2.

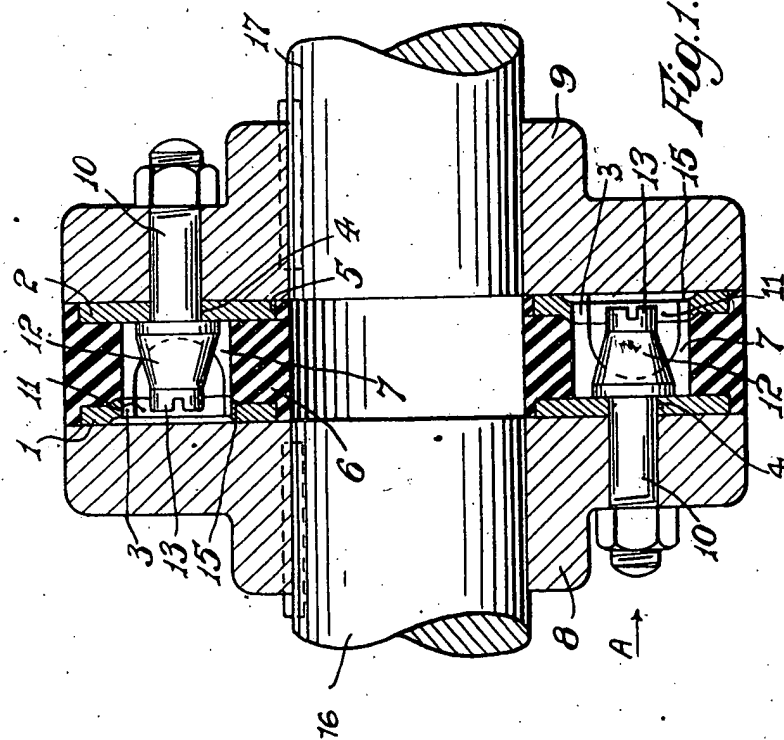


Fig. 1.

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# PATENT SPECIFICATION

Application Date: Sept. 15, 1944. No. 17659/44.

Complete Specification Left: July 4, 1945.

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DIV 45  
580,901

## PROVISIONAL SPECIFICATION

### Improvements in or relating to Shaft Couplings

We, DUNLOP RUBBER COMPANY LIMITED a British Company of 1, Albany Street, London, N.W.1 and JAMES CLAUDE HICKMAN a British Subject of the afore-  
5 said Company's Works at Fort Dunlop, Erdington, Birmingham in the County of Warwick, do hereby declare the nature of this invention to be as follows:—

10 This invention relates to improvements in or concerning coupling units for attachment to the driving and driven elements of a flanged coupling the said unit being of the type in which a resilient member is sandwiched between and bonded to two  
15 plates attachable to said elements by coupling bolts each of said plates being provided with holes of alternately small and large diameter and the resilient member having apertures of the same  
20 diameter as the larger of these holes.

The invention has for its object to provide a coupling unit in which overload upon the resilient member is relieved by metal to metal contact, thereby preventing  
25 damage to such resilient member and the interruption of the drive.

According to this invention we provide a flexible coupling unit for attachment to the driving and driven elements of a  
30 flanged coupling the said unit being of the type in which a resilient member is sandwiched between and bonded to two plates attachable to said elements by coupling bolts each of said plates being  
35 provided with holes of alternately small and large diameter and the resilient member having apertures of the same diameter as the larger of these holes wherein the holes of large diameter in the  
40 plates are slotted in the direction of the pitch circle of said holes and the apertures in the resilient member are enlarged adjacent to the slotted hole in each plate.  
as and for the purpose specified.

45 The head of the coupling bolt within the aperture of the resilient member is extended to be substantially flush with the outer surface of the plate, which may be depressed in the neighbourhood of the  
50 slotted holes. The extremity of each bolt head is preferably reduced in diameter to provide the clearance desired.

A convenient embodiment of a flexible  
[Price 1/-]

coupling unit constructed in accordance with the invention comprises two circular  
55 plates each having holes alternately of large and small diameter located on a common pitch circle. The plates may be centrally apertured. The plates are bonded to opposite sides of a resilient  
60 member of rubber or like material, said member being provided with cavities of large diameter located on a pitch circle corresponding to the common pitch circle of the holes in the plates. The resilient  
65 member may consist of an annulus of rectangular cross section.

The plates are secured one to the driving element and the other to the driven element of the coupling by coupling bolts  
70 threaded to the driving and driven elements through the small diameter holes in the plates each of such holes being aligned with one of the cavities in the resilient member and with one of the large  
75 holes in the other plate. Each of the large diameter holes in the plates is slotted along the pitch circle to permit of a predetermined angular movement between the plates, for example a maximum relative  
80 movement of the order of ten degrees, consequent upon distortion of the rubber element before metal to metal contact between the bolt heads and the ends of the slots prevents further relative angular  
85 movement between the plates.

Preferably each coupling bolt has a shank of substantially the same diameter as each of the small holes in the plates, and a cone shaped head which corresponds  
90 in length to the thickness of the resilient member and is provided at its extremity with narrow uniform diameter portion which may be of the same diameter as the shank of the bolt. The uniform diameter  
95 portion is substantially co-planar with the edge of the large slotted hole in the plate which may be locally depressed to ensure that the extremity of the bolt does not foul the face of the element of the coupling to  
100 which the plate is bolted. The walls of each of the cavities in the resilient member containing each of the bolt heads may be inclined from the small circular hole in one plate to the ends of the slots  
105 extending from the large hole in the

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large holes 3 in the other plates. Each of the large diameter holes in the plates is slotted at 11 Figs. 2 and 3 along the common pitch circle to permit of a  
 5 predetermined angular movement between the plates, for example a maximum relative movement of the order of ten degrees consequent upon distortion of the rubber member, before metal to metal contact  
 10 between the bolt heads and the ends of the slots prevents further relative angular movement between the plates.

Preferably each coupling bolt has a shank 10 of substantially the same  
 15 diameter as each of the small holes 4 in the plates, and a cone-shaped head 12 which corresponds in length to the thickness of the resilient member 6 and is provided at its extremity with a narrow  
 20 uniform diameter portion 13 which may be of the same diameter as the shank of the bolt. The uniform diameter portion is substantially co-planar with the edge 11 of one of the large slotted holes 3 in the plate  
 25 which may be locally depressed at 15 Figs. 1 and 3 to ensure that the extremity of the bolt does not foul the face of the element of the coupling to which the plate is bolted. The walls of each of the cavities  
 30 7 in the resilient member containing each of the bolt heads are enlarged adjacent the slotted hole in each plate by being inclined from the small circular hole in one plate to the ends of the slots 11 extending from  
 35 the large hole 3 in the opposite plate as shown in Fig. 3, such enlargement permitting angular movement between the plates unrestricted by the bolt heads and obviating damage to the resilient  
 40 material by contact with the heads of such bolts.

In operation slight overload or variation in load is absorbed by deformation of the resilient member consequent upon relative  
 45 angular movement between the plates of the unit. Severe overloading liable to destroy the resilient element is prevented at a predetermined torque by metal to

metal contact between the extremities of the bolts secured to one plate and the ends 50 of the slots in the other plate.

Having now particularly described and ascertained the nature of our said invention and in what manner the same is to be performed, we declare that what we 55 claim is:—

1. A flexible coupling unit for attachment to the driving and driven elements of a flanged coupling the said unit being of the type in which a resilient member is 60 sandwiched between and bonded to two plates attachable to said elements by coupling bolts each of said plates being provided with holes of alternately small and large diameter and the resilient 65 member having cavities of the same diameter as the larger of these holes wherein the heads of the coupling bolts within the cavities of the resilient member are extended to be substantially flush with the outer surface of the plates and the 70 holes of large diameter in the plates have slots extending in the direction of the pitch circle of said holes and the cavities in the resilient member are enlarged 75 adjacent to the slotted hole in each plate to permit metal to metal contact between the extremities of the bolts secured to one plate and the ends of the slots in the other plate at a predetermined torque. 80

2. A coupling unit according to claim 1 wherein the surface of each plate is depressed in the neighbourhood of the slotted holes.

3. A coupling unit according to either 85 of the preceding claims wherein the extremity of the bolt head has the same diameter as the bolt shank.

4. A flexible coupling unit and coupling bolts therefore substantially as described 90 with reference to the accompanying drawings.

Dated this 2nd day of July, 1945.

R. F. McKAY,

Acting for the Applicants.